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| Title of Lesson: | Finding the Acceleration of Earth’s Gravity (Guided Inquiry) | Date: 9/30/13 Timeframe of Lesson: 3 days |
| Author(s): | Jeff Benjamin | School District: Whitnall  Campus: Whitnall High School |
| Subject Area: | Science | Grade Level(s)/Course: Physics |
| Content Area Standards  (Next Generation Science Standards): | HS-PS2-4. Use mathematical representations of Newton’s Law of Gravitation to describe and predict the gravitational forces between objects.  ANALYZING AND INTERPRETING DATA: \* Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal  TYPES OF INTERACTIONS: \* Newton’s law of universal gravitation…provides a mathematical model to describe and predict the effects of gravitational forces between distant objects. \* Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space.  PATTERNS \* Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. | |
| National Educational Technology Standards for Students (NETS-S): | 3. Research and Information Fluency  *Students apply digital tools to gather, evaluate, and use information.*  a. Plan strategies to guide inquiry  d. Process data and report results  4. Critical Thinking, Problem Solving, and Decision Making  *Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate*  *digital tools and resources.*  a. Identify and define authentic problems and significant questions for investigation.  c. Collect and analyze data to identify solutions and/or make informed decisions. | |
| Stated Learning Objective(s) | Students will use informational technology to plan, prepare and conduct an experiment to determine the acceleration of Earth’s gravitational field.  Students will compare their results to those of Galileo and discuss   1. How technology has changed the ability of scientists to make discoveries. 2. How Galileo and Newton’s discoveries changed our model of the universe. | |
| Procedures for Lesson | Day 1:   1. Students will watch the introduction video on Galileo’s Leaning Tower of Pisa Experiment. <http://www.youtube.com/watch?v=_Kv-U5tjNCY> 2. Pose problem: How can Galileo’s experiment be modified using modern technology to determine the exact acceleration of Earth’s gravity? 3. Discuss what data will be needed and why. 4. Discuss how we will collect the data (what technology is needed.) 5. Students will write a purpose, hypothesis and procedure.   Day 2:   1. Collect data using Vernier Video Physics app for iPad. 2. Use Vernier Graphical Analysis to analyze the results.   Assignment:   1. Students will write their conclusions statements and submit them on the class wiki. 2. Students will read the conclusions from another group and provide peer feedback. 3. Students will submit formal lab report using the department lab report rubric. | |
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| **Technology Resources Cited in APA Format** | Falk, Dan. (2009, November 12). Galileo's "falling bodies" experiment re-created at Pisa [Video file]. Retrieved from <http://www.youtube.com/watch?v=_Kv-U5tjNCY>  Vernier Software and Technology, LLC: Video Physics  Available from <http://www.vernier.com/products/software/video-physics/>  Vernier Software and Technology, LLC: Graphical Analysis (version 3.8.4)  Available from <http://www.vernier.com/products/software/ga/> | |
| **Other Resources Cited in APA Format** |  | |
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